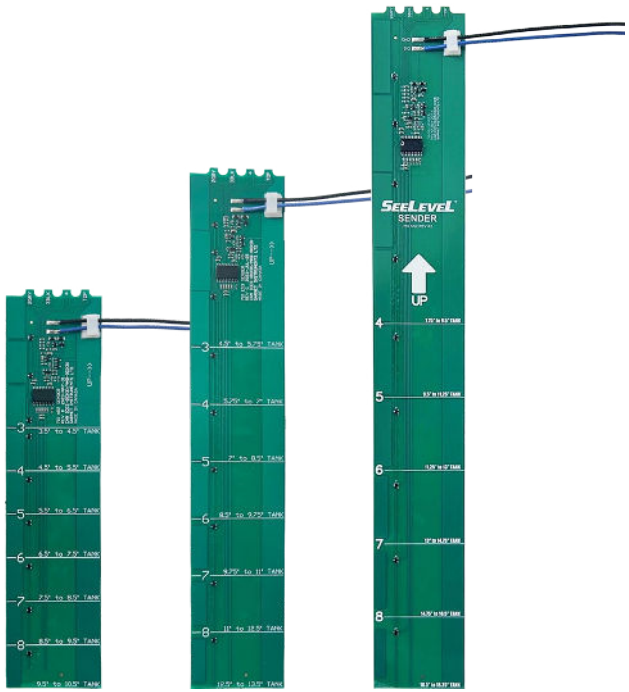
SeeLeveL™

HOLDING TANK MONITOR

SENDER MANUAL

710-AR2 | 710-ES3 | 710-SS2



Printed in Canada

CANADA
Garnet Instruments Ltd.
286 Kaska Road
Sherwood Park, AB T8A 4G7

USA
Garnet US Inc.
5360 Old Granbury Road
Granbury, TX 76049

GARNET
Liquid management solutions, your way.

RVgauge.com | 1-800-617-7384

INTRODUCTION

These SeeLeveL Senders are used with SeeLeveL Tank Monitoring systems that can monitor up to seven tanks, including 2 Fresh, 3 Grey, and 2 Black. The senders are mounted on the outside of the holding tanks and can be stacked to fit taller tanks. Depending on tank height and desired resolution, Garnet offers three different sender options. They work on most plastic or polyethylene holding tanks that contain water-soluble fluids and are not compatible with metal holding tanks.

The 710-AR2 is 9" high. The higher resolution is 0.25" which is optimal for low-profile tanks. This sender is ideal for tanks 3.5"-11" tall but can be stacked with an additional 710-AR2 to measure tanks as tall as 11".

The 710-ES3 sender is 12" high. It has a resolution of 0.33" and is the most popular option, designed to measure liquid levels in most standard holding tanks. It is ideal for tanks 4.5"-14" tall but can be stacked with an additional 710-ES3 to measure tanks as tall as 26".

The 710-SS2 sender is 16" high. It has a resolution of 0.44" designed for taller tanks. It is ideal for tanks 7.5"-18" tall but can be stacked with an additional 710-SS2 to measure tanks as tall as 34".

See more information about sender lengths on page 3.

The communication protocol used between our senders and displays is proprietary allowing us to control the accuracy and functionality of our systems ensuring our customers experience reliable operation.

SAFETY SYMBOLS INFORMATION

NOTE: expands on information for any procedures.

CAUTION: explains safety information that could cause damage to the product, including data loss.

WARNING: explains dangers that might result in personal injury or death.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

710-AR2-ES3-SS2 Manual_v1.3 - 04-Feb-2025

INSTALLATION INFORMATION

The installation for the complete system consists of mounting the display inside the RV, cutting and mounting the senders to the sides of the tanks, connecting the wiring, and programming the display.

This manual provides information on how to install the SeeLeveL 710-AR2, 710-ES3, and 710-SS2 senders.

⚠ **NOTE:** Previous model senders (710-JS, 710-ES, 710-ES2, 710-SS) can be combined with new sender models.

Before senders are installed the display should be installed first.

Refer to the **Display Installation Guide and User Manual** for the model you've purchased for all installation and connection details. All documentation can be found from the **Resource Library** found on our support page: https://www.garnetinstruments.com/support/

Before installing watch this video!

SCAN TO WATCH

RESOURCE LIBRARY

Tools and equipment required:

- ☐ Wire cutters/stripper
- ☐ Wire crimper
- ☐ Scissors or hole punch
- ☐ Acetone/rubbing alcohol
- ☐ Duct tape or tie-wraps for securing wires
- ☐ Non aggressive tape (painters, masking)
- ☐ Electrical tape
- ☐ Butt connectors

DETERMINE BEST PLACEMENT & CONFIGURATION

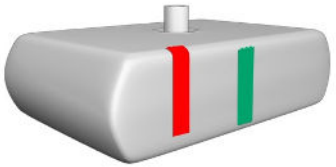
Sender Placement

The senders will need to have a flat area on the side of the tank large enough so the whole width of the sender is in contact with the side of the tank.

Make sure that any metal is at least 1" away from either side, top and bottom of the sender, and at least 2" away from the face of the sender.

Some tanks may have irregular shapes. DO NOT wrap the corners over the top or bottom of the tank.

See placement examples to the right.



⚠ **CAUTION:** Bending the sender sharply will damage the circuit on the sender.

Sender Configuration

To determine which sender configuration you need, measure the height of your tanks, then find out the measurable space (*see following page*). The measurable space is the "ideal" position of the sender on the tank. This will determine what length the senders should be. If a sender is too long, it will need to be cut. The following table has recommended senders and configurations for various tank heights.

Recommended Sender Options

Tank Height	Best Sender Option
3.5" - 11"	710-AR2 single
11" - 14"	710-ES3 single
14" - 18"	710-SS2 single
18" - 20"	710-AR2, stacked
18" - 26"	710-ES3, stacked
26" - 34"	710-SS2, stacked

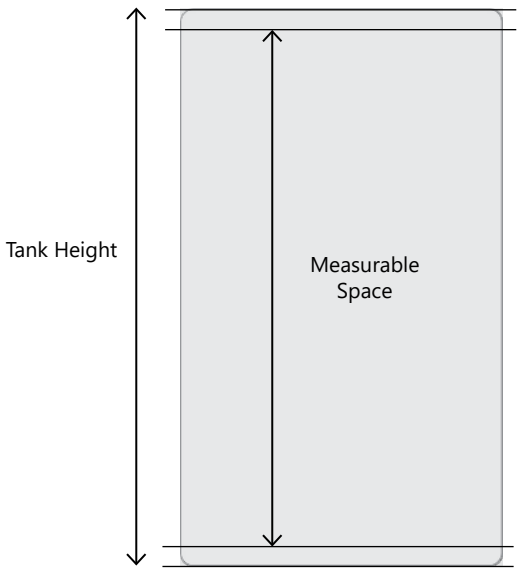
⚠ **CAUTION:** DO NOT mix sender types when stacking senders.

DETERMINE MEASURABLE SPACE ON TANKS

Find Measurable Space

Measure the height of the tank from top to bottom then determine measurable space.

- The minimum gap is 1/4", however, we recommend that the senders be installed 1/2" from the top and 1/2" from the bottom of the tank. Depending on the characteristics of the tank the gap can be a little more or less (see note below and installation tips on page 11). This gap ensures that the sender can read properly through the tank wall as the corners or rounded edges of the tanks can be too thick for the sender to read through.
- Subtract the gap space from the overall tank height. This will result in your measurable space. Use the calculation formula at the right.



NOTE: Although the recommended gap at the top and bottom of the tank is 1/2" the minimum gap can be 1/4".

The maximum gap for the 710-AR2 is 3/4" and 1" for the 710-ES3. See recommended sender options table on page 2.

CAUTION: Installing a sender outside of the recommended measurable space may affect your readings.

NOTE: This is not a static formula that can be used on every tank. With some fresh tanks, the outlet for the pump feed may sit more than 1 inch above the bottom of the tank. Your water pump may begin to suck air before the tank is completely empty. In these cases, you want to install the fresh tank sender above the outlet for the pump feed. This will ensure that the monitor reads "0" before the pump begins to suck air.

Single configuration

1. Measure the height of the tank.
2. Tank height = _____
3. Calculate the recommended measurable space as follows:

   Tank height – top gap – bottom gap = measurable space. ***See note regarding gap recommendations.***

NOTE: If senders do not fit full height of the tank, to optimize the level you can justify sender location to be either closer to the top or bottom, depending on the type of liquid (Fresh or Grey/Black).

FRESH = closer to bottom as it is preferable that this tank is not empty!

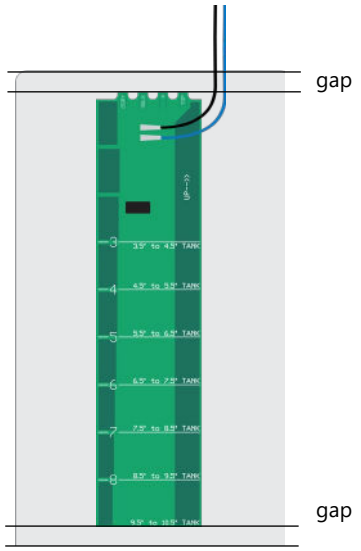
GREY/BLACK = closer to top as it is preferable that these tanks are not full!

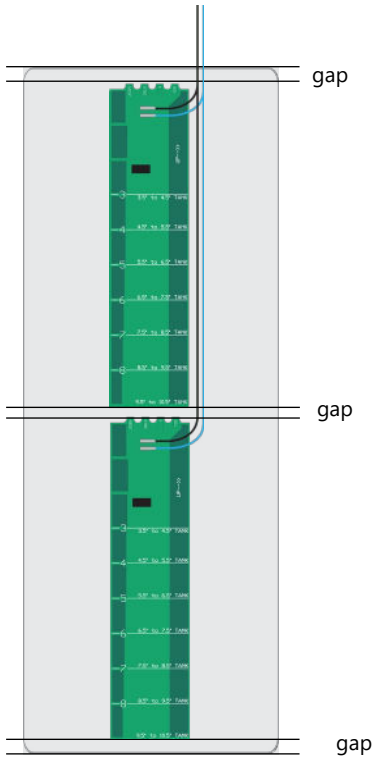
Stacked configuration

Two senders may be required for taller tanks and additional senders may be purchased for this application. There needs to be a gap of 1/16" to 1/8" between the double stacked senders. Calculate what the total length of measurable space for both senders will be:

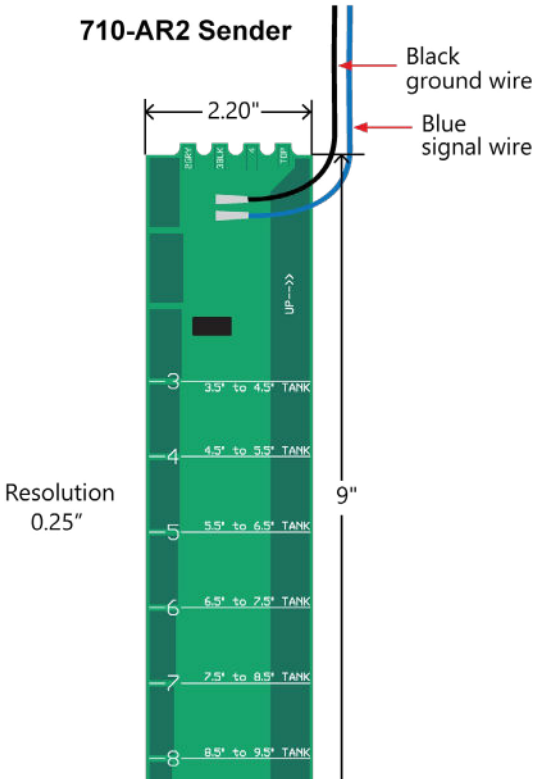
1. Measure the height of the tank.
2. Tank height = _____
3. Calculate the recommended measurable space
4. Tank height – top gap – bottom gap – middle gap = measurable space. ***See note regarding gap recommendations.***

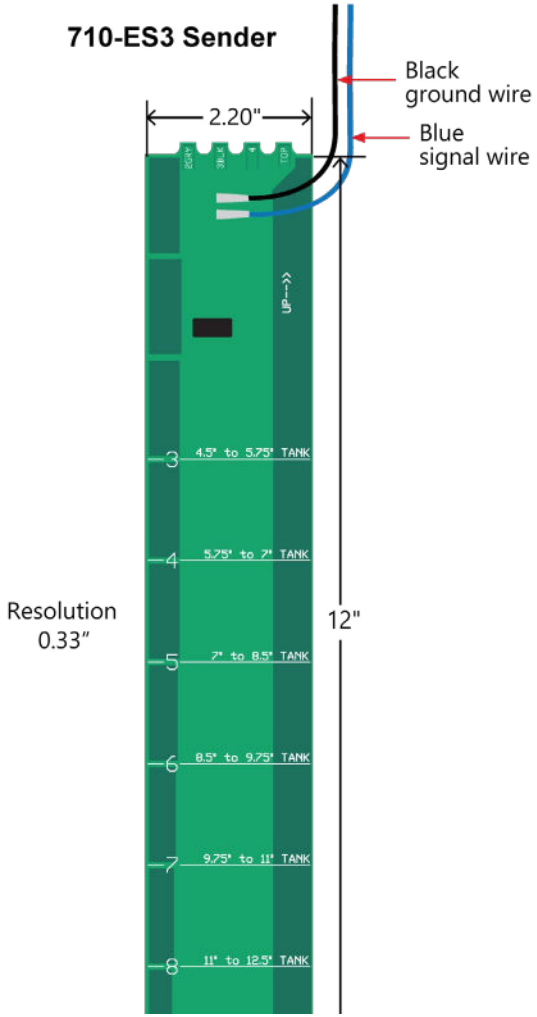
NOTE: Both senders in a double-stacked configuration should be approximately the same length.

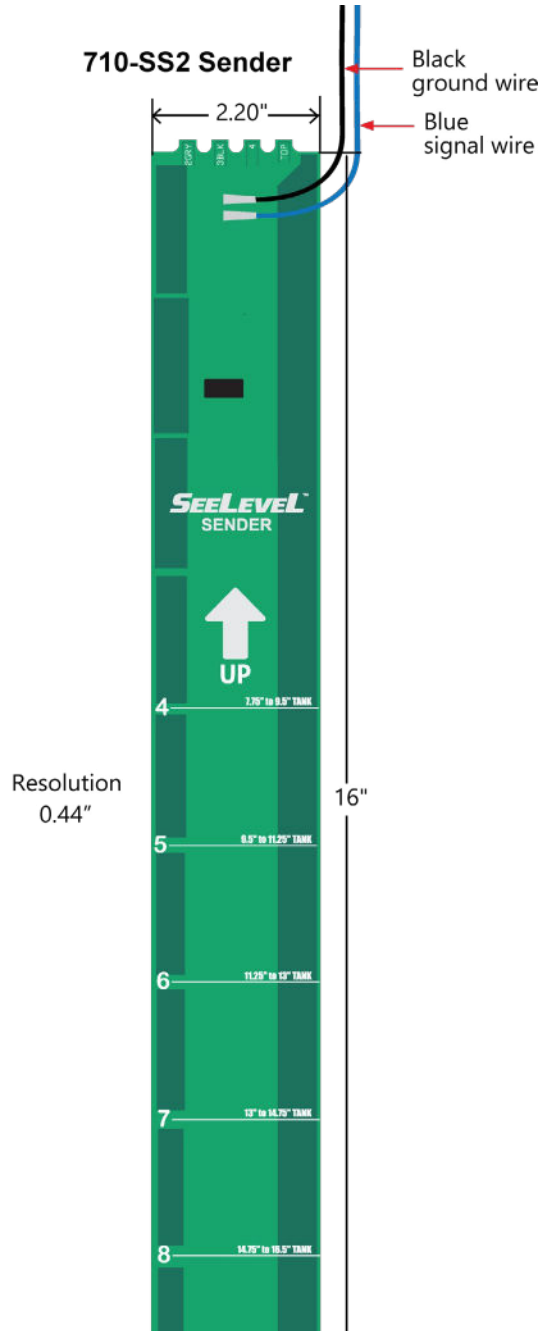




SENDER SPECIFICATIONS





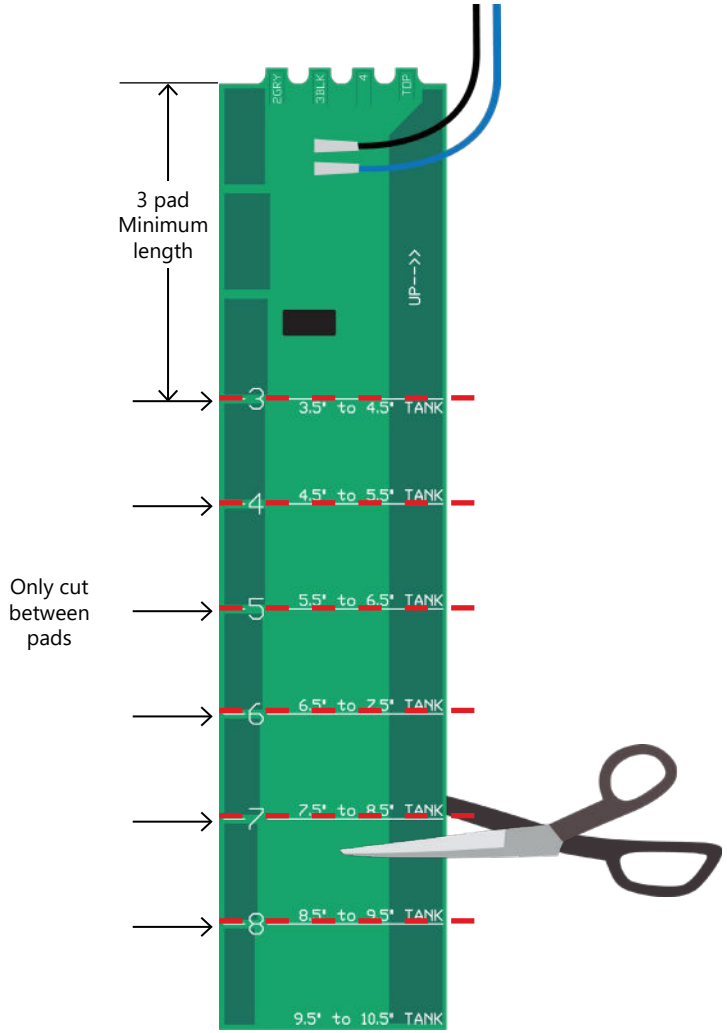


CUTTING SENDERS

The senders need to be cut to the required length to match the height of the measurable space of the tank.

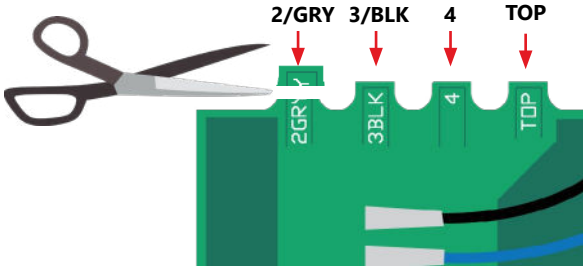
The cut must be between the sender segmented pads. Senders have a minimum length they can be cut. The minimum length is after the first three segmented pads.

Once this has been determined, cut the sender with a pair of scissors.



PROGRAMMING THE SENDERS

TABS



Senders are programmed by cutting off the tabs at the top of each sender to tell it which tank it will be mounted on, or if in a stacked configuration, whether they are on the top or bottom. A pair of scissors or a hole punch can be used to cut the sender tabs.

For tanks 5 through 7, use the sum of two tab numbers for that tank number. This will only work on display models that can read up to 7 tanks.

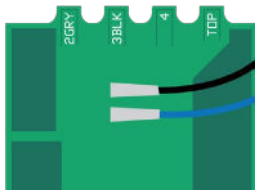
For examples of programming for each tank types refer to the table at the bottom and the illustrations on the next page.

TANK TYPE	TABS TO CUT
FRESH	No tab cut
GREY	2GRY
BLACK	3BLK
FRESH 2 (TANK 4)	4
GREY 2 (TANK 5)	2GRY + 3BLK
BLACK 2 (TANK 6)	2GRY + 4
GREY 3 (TANK 7)	3BLK + 4
GALLEY (only for displays with a GALLEY button)	2GRY + TOP
TOP Sender	Cut "TOP" tab + tank type tab

⚠ **CAUTION: MAKE SURE YOU CUT THE CORRECT TABS!** Cutting the wrong tabs will result in incorrect programming and this cannot be reversed and is not covered under warranty

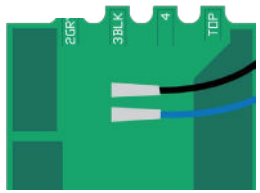
PROGRAMMING THE SENDERS

Tabs to cut for single sender or bottom sender if double-stacked.



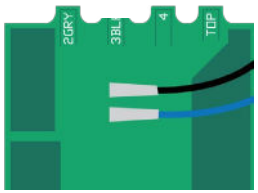
FRESH

2/GRY



GREY

3/BLK

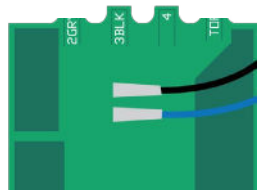


BLACK

NOTE: Previous model senders (710-JS, 710-ES, 710-ES2, 710-SS) can be combined with new sender models.

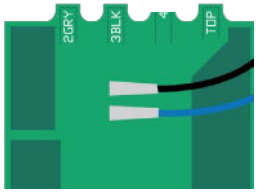
NOTE: For systems that have a Galley button. Cut the 2/GRY and the TOP tabs. For displays that have a GALLEY button the GREY and GALLEY tanks can only have one sender per tank and cannot be stacked.

2/GRY TOP



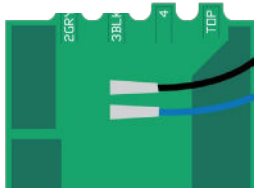
GALLEY

4



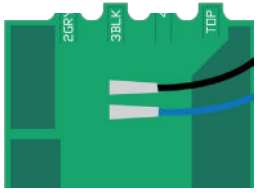
FRESH 2 (TANK 4)

2/GRY 3/BLK



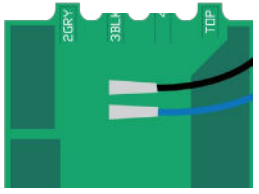
GREY 2 (TANK 5)

2/GRY 4



BLACK 2 (TANK 6)

3/BLK 4



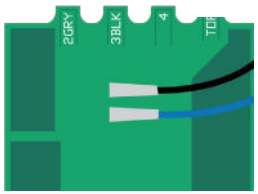
GREY 3 (TANK 7)

CAUTION: MAKE SURE YOU CUT THE CORRECT TABS! Cutting the wrong tabs will result in incorrect programming and this cannot be reversed and is not covered under warranty

NOTE: For tanks 5 through 7, use the sum of two tab numbers for that tank number. This will only work on models that can read up to 7 tanks.

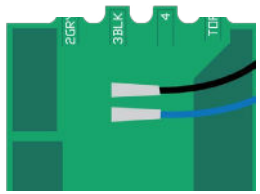
For a double-stacked tank configuration, the top sender requires an additional tab to be cut.

TOP



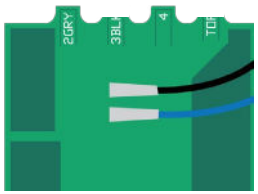
FRESH TOP

2/GRY TOP



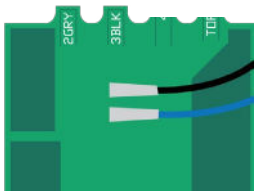
GREY TOP

3/BLK TOP



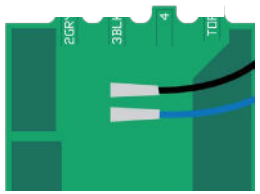
BLACK TOP

4 TOP



FRESH 2 TOP (TANK 4)

2/GRY 3/BLK TOP



GREY 2 TOP (TANK 5)

For Tanks 4 - 7 also cut the TOP tab as these examples indicate.

PREPARE SENDER FOR INSTALLATION

1 Clean the tank

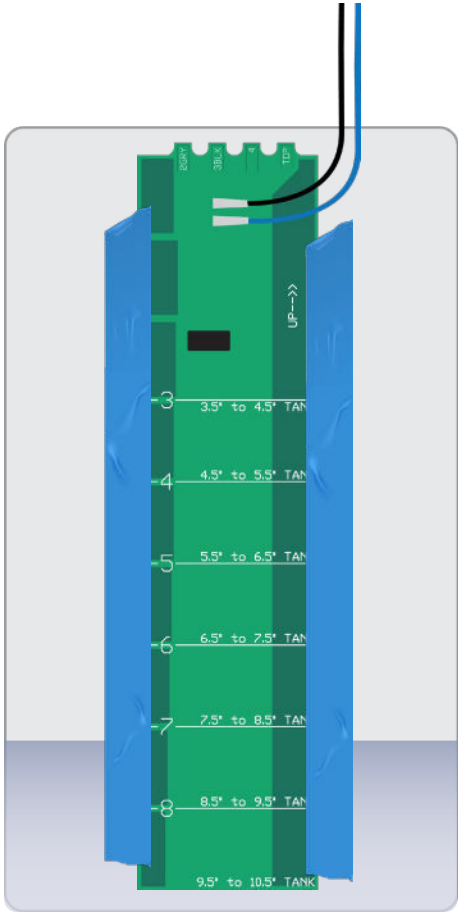
Clean area thoroughly where the sender will be mounted making sure there is no dust, grease and oil.

Acetone or rubbing alcohol will remove sticky residue.

2 Temporarily tape sender on tank

⚠ **CAUTION: DO NOT SKIP THE FOLLOWING STEPS.** Removing the sender from the tank after the sender has been permanently installed will cause damage to the sender that is NOT covered under warranty.

Once the sender is cut and programmed, temporarily tape the sender to the tank wall. Place a piece along the length of both sides of the sender and perform a test to verify operation.

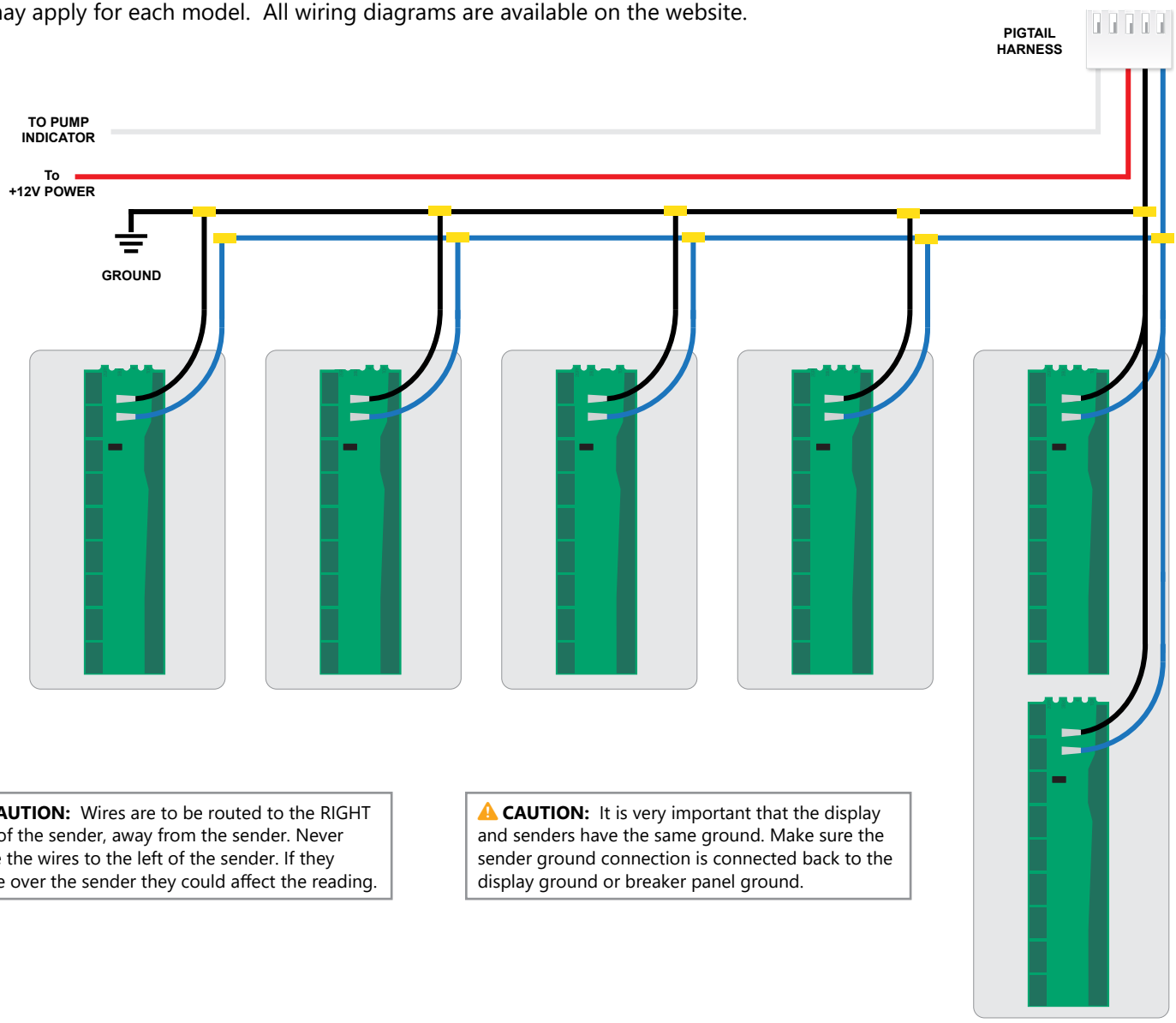


⚠ **CAUTION:** Route wires to the right, away from the senders. The wires indicate the top of the sender.

Use a non aggressive tape like painters tape or masking tape.

3 Connect the wiring to the pigtail

The following diagram shows the wiring from the sender to the pigtail. Other wiring connections may apply for each model. All wiring diagrams are available on the website.



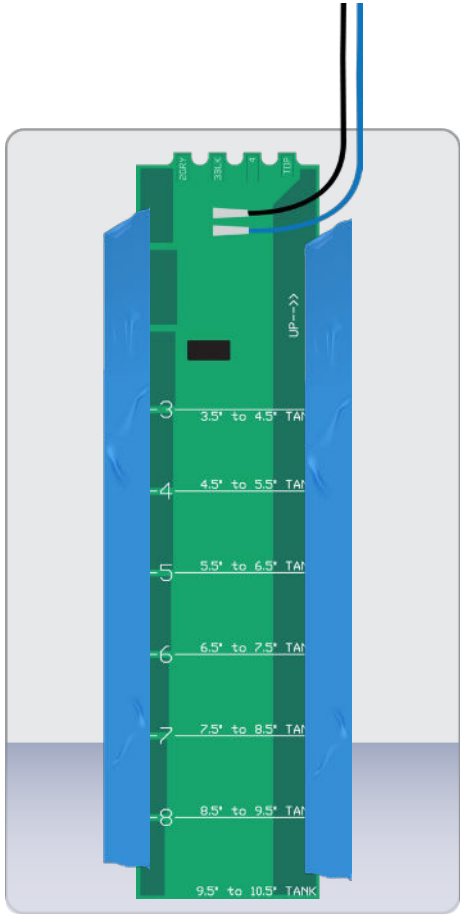
Up to 7 tanks can be connected.

Stacked configuration

⚠ **CAUTION:** Wires are to be routed to the RIGHT side of the sender, away from the sender. Never route the wires to the left of the sender. If they drape over the sender they could affect the reading.

⚠ **CAUTION:** It is very important that the display and senders have the same ground. Make sure the sender ground connection is connected back to the display ground or breaker panel ground.

4 Verify operation before permanently adhering the sender to the tank.



Tank levels operation test

For the initial test, have the tank at least 1/4 full of water or sewage.

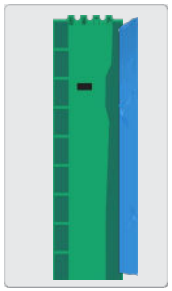
Verify that the percent level reading on the display panel looks correct.

Signal strength test

The signal power is an indication of how much signal is being transmitted through the tank wall and picked up by the receiver part of the sender.

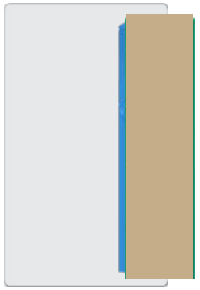
Typical signal power should be 50% to 60%. The gauge will work with minimum signal strength as low as 20%, but it is good to have at least 50% to 60% at installation so that there is some margin available for buildup in the tank. P00 = **100%**.

5 Permanently adhere sender to the tank

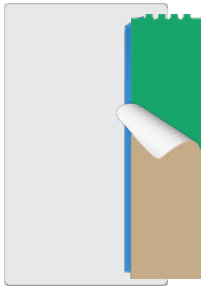


Once proper operation has been confirmed, the sender will be ready to be permanently installed to the tank wall.

Remove one side of the tape.

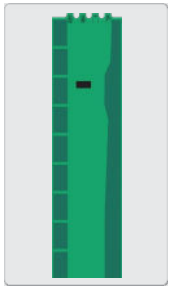


Fold the sender over so it is still attached with one side of the tape.



Slowly peel the backing paper off the adhesive.

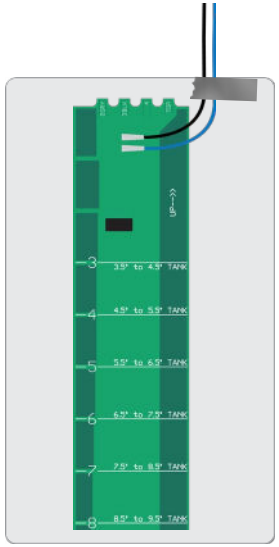
⚠ **CAUTION:** Be careful not to bend the senders excessively or you could damage the circuits. You only have one shot at this. If you try to peel it off the tank once it is stuck the sender may be damaged by the sharp bending. Removing the sender after it's been adhered voids the warranty.



Carefully fold the sender back and press the sender down to the tank so that all of the adhesive is contacting the tank wall. Make sure there are no air gaps between the sender and the tank. Remove the other side of the temporary tape.

6 Secure the wires

Secure the wires with duct tape, tie wraps, or something similar so that the wires do not rattle or press against the sender, this may result in sender damage or wires breaking over time.



7 Apply undercoating to the senders

On installations where the holding tank is exposed to under chassis road spray and flying rocks etc. We recommend using:

3M 03584 Professional Grade Rubberized Undercoating

Gravel Guard Rocker Guard Coating By Dominion Sure Seal

Gorilla Glue Waterproof Patch & Seal Tape